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PATENT ABSTRACTS OF JAPAN

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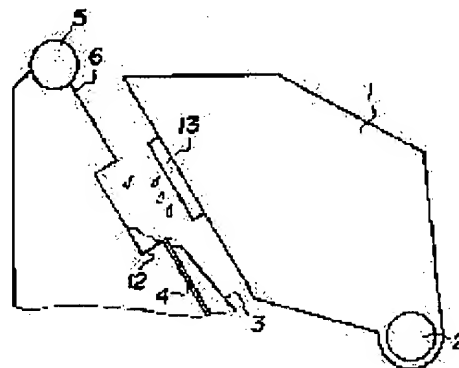
(72)Inventor : KAGEYAMA TETSUHIITO
MOTAI HIDEKAZU

(54) INK JET RECORDING APPARATUS

(57)Abstract:

PURPOSE: To prevent the contamination of a platen with an ink liquid droplet or the contamination of the rear surface of recording paper with bonded ink by providing a groove to the platen along the main scanning direction of a recording head.

CONSTITUTION: A groove 12 is provided to a platen 6 so as to be almost exactly opposed to a recording head 13 at almost the same height as the head 13. This groove 12 is extended along the main scanning direction of the recording head 13. When recording paper 4 is absent in front of the recording head, the ink liquid droplet emitted from the recording head 13 is stored in the groove 12 of the platen 6. As a result, the platen 6 supporting the recording paper 4 is not contaminated and the contamination of the rear surface of the recording paper 4 due to the adhesion of the ink liquid droplet is eliminated. The dimension of the groove 12 is set so that the length of the groove in the lateral direction of the groove 12 is set to 9.0mm when the width of the emitting orifice arrangement of the recording head is 9.0mm and the depth of the groove 12 is set to about 8mm.



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CLAIMS

[Claim(s)]

[Claim 1] The ink-jet recording device characterized by providing the platen which counters the aforementioned recording head and supports the aforementioned record medium-ed, and the slot established in this platen along with the main scanning direction of the aforementioned recording head in the ink-jet recording device which records on a record medium-ed from this recording head using the recording head which carries out the regurgitation of the record drop.

[Claim 2] The ink-jet recording device according to claim 1 characterized by preparing aforementioned Mizouchi the absorber for absorbing a record drop.

[Claim 3] The aforementioned recording head is an ink-jet recording device according to claim 1 or 2 characterized by making record liquid generate a foam using heat energy, and carrying out the regurgitation of the record drop based on generation of this foam.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to an ink-jet recording device.

[0002]

[Description of the Prior Art] Drawing 7 is the typical side elevation showing the 1 conventional example of an ink-jet recording device.

[0003] The carriage 1 which carried the recording head 13 slides in a drawing and the right-angled direction along with a rail 2. On the recording paper 4 conveyed through between a platen 6 and the paper presser-foot boards 3, from a recording head, an ink drop is breathed out and this records. The recorded recording paper 4 is discharged by the exterior of equipment with the ejection roller 5, being supported by the platen 6.

[0004] However, the state where there is no recording paper 4 in the transverse plane of a recording head 13 may occur by getting the recording paper 4 blocked in the place of the paper presser-foot board 3, or the width of face of the recording paper 4 not running short, without conveying the recording paper of the set-up size, or not feeding paper to the recording paper 4 with a non-illustrated feed roller, in case the regurgitation of the ink is carried out to the recording paper 4 from a recording head 13, as shown in drawing 8 etc. If an ink drop is breathed out from a recording head 13 at this time, ink will adhere to a platen 6 and a platen 6 will become dirty. In such a case, a platen 6 may deteriorate with this dirt. Moreover, if a platen 6 becomes dirty, it will also become ink adhering to the rear face of the recording paper 4 conveyed next, and soiling the ejection roller 5 which conveys the recording paper 4.

[0005]

[Problem(s) to be Solved by the Invention] Many methods are proposed in order to prevent that there is no recording paper in the transverse plane of a recording head. However, there were the following troubles in these methods.

[0006] (1) Although a feed sensor may be used since a poor feed is prevented, even if it detected feeding of the recording paper by this, when slipping between a feed roller (un-illustrating) and the recording paper 4 arises with the operating environment and paper type on which the ink-jet recording device is put, paper may not be fed to the recording paper 4. Consequently, search to the record section of the recording paper 4 runs short.

[0007] (2) Although there is composition (un-illustrating) which detects paper width by the optical sensor carried in carriage 1 in order to prevent the shortage of paper width, detect paper width here at the time of the scan of the 1st carriage 1. However, when the traverse speed of carriage 1 is early, width of face may be detected for a long time rather than actual paper width. For this reason, the incorrect regurgitation of the ink drop may be carried out out of an actual record section.

[0008] Moreover, since the traverse speed of carriage 1 is gathered in order to carry out record operation early, or it corresponds to colorization of an ink-jet recording device, in preparing many recording heads, there is probability of the incorrect regurgitation of the ink drop to the platen 6 without the recording paper 4 also with a bird clapper highly.

[0009] Then, it is in the purpose of this invention offering the ink-jet recording device which does not soil the rear face of the recording paper in the ink which soiled the platen by the ink drop or adhered to the platen, when the trouble mentioned above is canceled and there is no recording paper in the transverse plane of a recording head.

[0010]

[Means for Solving the Problem] In order to attain such a purpose, using the recording head which carries out the regurgitation of the record drop, the ink-jet recording device of this invention counters the aforementioned recording head in the ink-jet recording device which records on a record medium-ed from this recording head, and is characterized by providing the platen which supports the aforementioned record medium-ed, and the slot established in this platen along with the main scanning direction of the aforementioned recording head.

[0011]

[Function] Since the slot was established in the platen which counters a recording head and supports the recording paper along with the main scanning direction of a recording head according to this invention, when there is no recording paper in the transverse plane of a recording head, the ink drop breathed out from the recording head collects on Mizouchi, and it can prevent that the rear face of a platen or the recording paper becomes dirty.

[0012]

[Example] Hereafter, the example of this invention is explained in detail, referring to a drawing.

[0013] Drawing 1 is the typical front view of the ink-jet recording device concerning this invention.

[0014] In drawing 1, a recording head is carried in carriage 1 and a rail 2 supports carriage 1 to revolve possible [sliding]. The paper presser-foot board 3 is arranged under the platen 6, and makes the front face of the recording paper 4 flat. The ejection roller 5 is formed above a platen 6, collaborates with a spur 9, and conveys the recording paper 4. A platen 6 supports the recording paper 4. A blade 7 is formed near the home position of a recording head, and wipes the delivery side of a recording head. capping -- including a suction means by which it does not illustrate, thickening ink is removed or a member 8 prevents dryness of the ink near the delivery side The ink attracted by the above-mentioned suction means through the ink tube 10 is discharged to a waste ink tank (un-illustrating). Moreover, a regurgitation signal is transmitted to a recording head by the flexible circuit board 11.

[0015] Next, operation of the ink-jet recording device shown in drawing 1 is explained.

[0016] The carriage 1 which carried the recording head moves to right and left among drawing along with a rail 2 (scan). When carriage 1 moves to the right from *****, an ink drop is breathed out from a recording head and it records on the recording paper 4. Moreover, when carriage 1 moves to the left from drawing Nakamigi, an ink drop can be breathed out and record is not performed on ** and the recording paper 4.

[0017] It engages with a blade 7 between the movement, the delivery side is wiped, and a recording head reaches a home position after that.

[0018] Furthermore, the ink of the delivery side is attracted through the ink tube 10, and, as for the recording head by which capping was carried out at the home position, recovery action is performed. After the above recovery action is completed, the recorded recording paper 4 is sent to a delivery tray (un-illustrating) by the ejection roller 5 and the spur 9.

[0019] Example 1 drawing 2 is the typical side elevation showing the 1st example of this invention. In this view, the same sign is given to the same composition as drawing 1, and explanation is omitted.

[0020] In this example, it is the almost same height as a recording head 13, and the slot 12 is mostly established in the front platen 6. This slot 12 has extended along with the main scanning direction of a recording head, as shown in the typical perspective diagram of drawing 3. Thereby, when there is no recording paper 4 in the transverse plane of a recording head, the ink drop breathed out from the recording head 13 collects in the slot 12 of a platen 6. Consequently, it is canceled that do not soil the platen 6 which supports the recording paper 4, and an ink drop adheres to the rear face of the recording paper 4, and the recording paper 4 becomes dirty. As a size of a slot 12, when the width of face of the delivery array of a recording head is 9.0mm, similarly the crosswise length is set as 9.0mm, for example, and depth is set as about 8mm. In addition, a slot 12 can be fabricated in one with a platen 6.

[0021] Drawing 4 is the typical side elevation showing the modification of the example shown in drawing 2.

[0022] It is made for a bottom to be well covered with an ink drop by making the side of a slot 12 into a trapezoidal shape in drawing 4. Moreover, the edge by the side of the ejection roller 5 of the platen 6 and really fabricated slot 12 is made low, or a radius of circle is given. By this, the recording paper 4 can prevent being caught in the ejection roller 5 side.

[0023] Example 2 drawing 5 is the typical side elevation showing the 2nd example of this invention.

[0024] An absorber 14 like free textile fabrics of 3mm in thickness and 1.0g or more of ink absorbed dose was put in the platen 6 and really fabricated slot 12. By this, when there is no recording paper 4 in the transverse plane of a recording head 13, the ink drop breathed out from the recording head 13 can be absorbed using an absorber 14. Consequently, ink can prevent the dirt of the rear face of the recording paper 4 from a slot 12, without dispersing. By making it small as compared with the size of a slot 12, using thickness as 3.0mm using width of face of an absorber 14 as 8.0mm in this case, even when the absorbed dose of absorber 14 self is exceeded, a slot 12 is covered with ink liquid, and the dirt to the recording paper 4 can be prevented.

[0025] Drawing 6 is the typical perspective diagram showing the modification of the 2nd example shown in drawing 5.

[0026] In drawing 6, an absorber 14 is made to extend in the main scanning direction of a recording head, and movement of a slot 12 to right and left among drawing is enabled. An absorber 14 is easily exchangeable with this. Moreover, if a handle 15 is formed in the edge of an absorber 14 in this case, it can prevent that ink adheres to a hand.

[0027] (in addition to this) In addition, especially this invention is equipped with meanses (for example, an electric thermal-conversion object, a laser beam, etc.) to generate heat energy as energy used also in an ink-jet recording method in order to make the ink regurgitation perform, and brings about the effect which was excellent in the recording head of the method which makes the change of state of ink occur with the aforementioned heat energy, and the recording device. It is because the densification of record and highly minute-ization can be attained according to this method.

[0028] About the typical composition and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called on-demand type and a continuous system On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the on-demand type case By impressing at least one driving signal which gives the rapid temperature rise which corresponds to recording information and exceeds nucleate boiling Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a recording head is made to produce film boiling and the foam in the liquid (ink) corresponding to this driving signal can be formed by the one to one as a result, it is effective. A liquid (ink) is made to breathe out through opening for regurgitation by growth of this foam, and contraction, and at least one drop is formed. If this driving signal is made into the shape of a pulse form, since growth contraction of a foam will be performed appropriately instantly, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of the shape of this pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and the 4345262 specification is suitable. In addition, if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.

[0029] The composition using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the composition arranged to a delivery which is indicated by each above-mentioned specification as composition of a recording head, the liquid route, and the field to which the heat operation section other than the combination composition (a straight-line-like liquid flow channel or right-angled liquid flow channel) of an electric thermal-conversion object is crooked is also included in this invention. In addition, the effect of this invention is effective also as composition based on JP,59-138461,A which indicates the composition whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the composition which makes a common slit the regurgitation section of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to the regurgitation section. That is, it is because it can record efficiently certainly according to this invention no matter the gestalt of a recording head may be what thing.

[0030] Furthermore, this invention is effectively applicable also to the recording head of the full line type which has the length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, any of the composition which fills the length with the combination of two or more recording heads, and the

composition as one recording head formed in one are sufficient.

[0031] In addition, this invention is effective when the thing of a serial type like an upper example also uses the recording head fixed to the main part of equipment, the recording head exchangeable chip type to which the electric connection with the main part of equipment and supply of the ink from the main part of equipment are attained by the main part of equipment being equipped, or the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one.

[0032] Moreover, it is a book as composition of the recording device of this invention to add the regurgitation recovery means of a recording head, preliminary auxiliary means, etc. If these are mentioned concretely, a preheating means to heat using the capping means, the cleaning means, the pressurization or the suction means, the electric thermal-conversion object, the heating elements different from this, or such combination over a recording head, and a reserve regurgitation means to perform the regurgitation different from record can be mentioned.

[0033] moreover, two or more ink which differs in an others and record color or concentration although only one piece was prepared also about the kind or the number of a recording head carried, for example corresponding to monochromatic ink -- corresponding -- two or more pieces -- more than -- it may be prepared That is, although not only the recording mode of only mainstream colors, such as black, but a recording head may be constituted in one as a recording mode of a recording device or the paddle gap by two or more combination is sufficient, for example, this invention is very effective also in equipment equipped with at least one of each of the full color recording mode by the double color color of a different color, or color mixture.

[0034] Furthermore, in addition, in this invention example explained above, although ink is explained as a liquid It is ink solidified less than [a room temperature or it], and what is softened or liquefied at a room temperature may be used. Or by the ink-jet method, since what carries out a temperature control is common as a temperature control is performed for ink itself within the limits of 30 degrees C or more 70 degrees C or less and it is in the stable regurgitation range about the viscosity of ink, ink may use what makes the shape of liquid at the time of use record signal grant. In addition, in order to prevent the temperature up by heat energy positively because you make it use it as energy of the change of state from a solid state to the liquid state of ink, or in order to prevent evaporation of ink, you may use the ink which solidifies in the state of neglect and is liquefied by heating. Anyway, ink liquefies by grant according to the record signal of heat energy, and this invention can be applied when using the ink of the property liquefied for the first time by grant of heat energy, such as that by which liquefied ink is breathed out, and a thing which it already begins to solidify when reaching a record medium. The ink in such a case is good for a porosity sheet crevice or a breakthrough which is indicated by JP,54-56847,A or JP,60-71260,A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the state where it was held as a solid. In this invention, the most effective thing performs the film-boiling method mentioned above to each ink mentioned above.

[0035] Furthermore, in addition, as a gestalt of this invention ink-jet recording device, although used as the picture outgoing end end of information management systems, such as a computer, you may take the gestalt of the reproducing unit combined with others, the reader, etc., and the facsimile apparatus which has a transceiver function further.

[0036]

[Effect of the Invention] Since the slot was established in the platen which counters a recording head and supports the recording paper along with the main scanning direction of a recording head according to this invention as explained above, when there is no recording paper in the transverse plane of a recording head, the ink drop breathed out from the recording head collects on Mizouchi, and it can prevent that the rear face of a platen or the recording paper becomes dirty.

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TECHNICAL FIELD

[Industrial Application] this invention relates to an ink-jet recording device.

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PRIOR ART

[Description of the Prior Art] Drawing 7 is the typical side elevation showing the 1 conventional example of an ink-jet recording device.

[0003] The carriage 1 which carried the recording head 13 slides in a drawing and the right-angled direction along with a rail 2. On the recording paper 4 conveyed through between a platen 6 and the paper presser-foot boards 3, from a recording head, an ink drop is breathed out and this records. The recorded recording paper 4 is discharged by the exterior of equipment with the ejection roller 5, being supported by the platen 6.

[0004] However, the state where there is no recording paper 4 in the transverse plane of a recording head 13 may occur by getting the recording paper 4 blocked in the place of the paper presser-foot board 3, or the width of face of the recording paper 4 not running short, without conveying the recording paper of the set-up size, or not feeding paper to the recording paper 4 with a non-illustrated feed roller, in case the regurgitation of the ink is carried out to the recording paper 4 from a recording head 13, as shown in drawing 8 etc. If an ink drop is breathed out from a recording head 13 at this time, ink will adhere to a platen 6 and a platen 6 will become dirty. In such a case, a platen 6 may deteriorate with this dirt. Moreover, if a platen 6 becomes dirty, it will also become ink adhering to the rear face of the recording paper 4 conveyed next, and soiling the ejection roller 5 which conveys the recording paper 4.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since the slot was established in the platen which counters a recording head and supports the recording paper along with the main scanning direction of a recording head according to this invention as explained above, when there is no recording paper in the transverse plane of a recording head, the ink drop breathed out from the recording head collects on Mizouchi, and it can prevent that the rear face of a platen or the recording paper becomes dirty.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Many methods are proposed in order to prevent that there is no recording paper in the transverse plane of a recording head. However, there were the following troubles in these methods.

[0006] (1) Although a feed sensor may be used since a poor feed is prevented, even if it detected feeding of the recording paper by this, when slipping between a feed roller (un-illustrating) and the recording paper 4 arises with the operating environment and paper type on which the ink-jet recording device is put, paper may not be fed to the recording paper 4. Consequently, search to the record section of the recording paper 4 runs short.

[0007] (2) Although there is composition (un-illustrating) which detects paper width by the optical sensor carried in carriage 1 in order to prevent the shortage of paper width, detect paper width here at the time of the scan of the 1st carriage 1. However, when the traverse speed of carriage 1 is early, width of face may be detected for a long time rather than actual paper width. For this reason, incorrect discharge ***** is about an ink drop outside an actual record section.

[0008] Moreover, since the traverse speed of carriage 1 is gathered in order to carry out record operation early, or it corresponds to colorization of an ink-jet recording device, in preparing many recording heads, there is probability of incorrect **** of the ink drop to the platen 6 without the recording paper 4 also with a bird clapper highly.

[0009] Then, it is in the purpose of this invention offering the ink-jet recording device which does not soil the rear face of the recording paper in the ink which soiled the platen by the ink drop or adhered to the platen, when the trouble mentioned above is canceled and there is no recording paper in the transverse plane of a recording head.

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MEANS

[Means for Solving the Problem] In order to attain such a purpose, using ***** which breathes out a record drop, the ink-jet recording device of this invention counters the aforementioned recording head in the ink-jet recording device which records on a record medium-ed from this recording head, and is characterized by providing the platen which supports the aforementioned record medium-ed, and the slot established in this platen along with the main scanning direction of the aforementioned recording head.

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OPERATION

[Function] Since the slot was established in the platen which counters a recording head and supports the recording paper along with the main scanning direction of a recording head according to this invention, when there is no recording paper in the transverse plane of a recording head, the ink drop breathed out from the recording head collects on Mizouchi, and it can prevent that the rear face of a platen or the recording paper becomes dirty.

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EXAMPLE

[Example] Hereafter, the example of this invention is explained in detail, referring to a drawing.

[0013] Drawing 1 is the typical front view of the ink-jet recording device concerning this invention.

[0014] In drawing 1, a recording head is carried in carriage 1 and a rail 2 supports carriage 1 to revolve possible [sliding]. The paper presser-foot board 3 is arranged under the platen 6, and makes the front face of the recording paper 4 flat. The ejection roller 5 is formed above a platen 6, collaborates with a spur 9, and conveys the recording paper 4. A platen 6 supports the recording paper 4. A blade 7 is formed near the home position of a recording head, and wipes the delivery side of a recording head. capping -- including a suction means by which it does not illustrate, thickening ink is removed or a member 8 prevents dryness of the ink near the delivery side. The ink attracted by the above-mentioned suction means through the ink tube 10 is discharged to a waste ink tank (un-illustrating). Moreover, a regurgitation signal is transmitted to a recording head by the flexible circuit board 11.

[0015] Next, operation of the ink-jet recording device shown in drawing 1 is explained.

[0016] The carriage 1 which carried the recording head moves to right and left among drawing along with a rail 2 (scan). When carriage 1 moves to the right from *****, an ink drop is breathed out from a recording head and it records on the recording paper 4. Moreover, when carriage 1 moves to the left from drawing Nakamigi, an ink drop can be breathed out and record is not performed on ** and the recording paper 4.

[0017] It engages with a blade 7 between the movement, the delivery side is wiped, and a recording head reaches a home position after that.

[0018] Furthermore, the ink of the delivery side is attracted through the ink tube 10, and, as for the recording head by which capping was carried out at the home position, recovery action is performed. After the above recovery action is completed, the recorded recording paper 4 is sent to a delivery tray (un-illustrating) by the ejection roller 5 and the spur 9.

[0019] Example 1 drawing 2 is the typical side elevation showing the 1st example of this invention. In this view, the same sign is given to the same composition as drawing 1, and explanation is omitted.

[0020] In this example, it is the almost same height as a recording head 13, and the slot 12 is mostly established in the front platen 6. This slot 12 has extended along with the main scanning direction of a recording head, as shown in the typical perspective diagram of drawing 3. Thereby, when there is no recording paper 4 in the transverse plane of a recording head, the ink drop breathed out from the recording head 13 collects in the slot 12 of a platen 6. Consequently, it is canceled that do not soil the platen 6 which supports the recording paper 4, and an ink drop adheres to the rear face of the recording paper 4, and the recording paper 4 becomes dirty. As a size of a slot 12, when the width of face of the delivery array of a recording head is 9.0mm, similarly the crosswise length is set as 9.0mm, for example, and depth is set as about 8mm. In addition, a slot 12 can be fabricated in one with a platen 6.

[0021] Drawing 4 is the typical side elevation showing the modification of the example shown in drawing 2.

[0022] It is made for a bottom to be well covered with an ink drop by making the side of a slot 12 into a trapezoidal shape in drawing 4. Moreover, the edge by the side of the ejection roller 5 of the platen 6 and really fabricated slot 12 is made low, or a radius of circle is given. By this, the recording paper 4 can prevent being caught in the ejection roller 5 side.

[0023] Example 2 drawing 5 is the typical side elevation showing the 2nd example of this invention.

[0024] An absorber 14 like free textile fabrics with 3mm [in thickness] and an amount [of ink absorption] of 1.0g or more was put in the platen 6 and really fabricated slot 12. By this, when there is no recording paper 4 in the transverse plane of a recording head 13, the ink drop breathed out from the recording head 13 can be absorbed using an absorber 14. Consequently, ink can prevent the dirt of the rear face of the recording paper 4 from a slot 12, without dispersing. By making it small as compared with the size of a slot 12, using thickness as 3.0mm using width of face of an absorber 14 as 8.0mm in this case, even when the amount of absorption of absorber 14 self is exceeded, a slot 12 is covered with ink liquid, and the dirt to the recording paper 4 can be prevented.

[0025] Drawing 6 is the typical perspective diagram showing the modification of the 2nd example shown in drawing 5.

[0026] In drawing 6, an absorber 14 is made to extend in the main scanning direction of a recording head, and movement of a slot 12 to right and left among drawing is enabled. An absorber 14 is easily exchangeable with this. Moreover, if a handle 15 is formed in the edge of an absorber 14 in this case, it can prevent that ink adheres to a hand.

[0027] (in addition to this) In addition, especially this invention is equipped with meanses (for example, an electric thermal-conversion object, a laser beam, etc.) to generate heat energy as energy used also in an ink-jet recording method in order to make the ink regurgitation perform, and brings about the effect which was excellent in the recording head of the method which makes the change of state of ink occur with the aforementioned heat energy, and the recording device. It is because the densification of record and highly minute-ization can be attained according to this method.

[0028] About the typical composition and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called on-demand type and a continuous system. On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the on-demand type case. By impressing at least one driving signal which gives the rapid temperature rise which corresponds to recording information and exceeds nucleate boiling. Since make an electric thermal-conversion object generate heat energy,

the heat operating surface of a recording head is made to produce film boiling and the foam in the liquid (ink) corresponding to this driving signal can be formed by the one to one as a result, it is effective. A liquid (ink) is made to breathe out through opening for regurgitation by growth of this foam, and contraction, and at least one drop is formed. If this driving signal is made into the shape of a pulse form, since growth contraction of a foam will be performed appropriately instantly, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of the shape of this pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and the 4345262 specification is suitable. In addition, if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.

[0029] The composition using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the composition arranged to a delivery which is indicated by each above-mentioned specification as composition of a recording head, the liquid route, and the field to which the heat operation section other than the combination composition (a straight-line-like liquid flow channel or right-angled liquid flow channel) of an electric thermal-conversion object is crooked is also included in this invention. In addition, the effect of this invention is effective also as composition based on JP,59-138461,A which indicates the composition whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the composition which makes a common slit the regurgitation section of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to the regurgitation section. That is, it is because it can record efficiently certainly according to this invention no matter the gestalt of a recording head may be what thing.

[0030] Furthermore, this invention is effectively applicable also to the recording head of the full line type which has the length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, any of the composition which fills the length with the combination of two or more recording heads, and the composition as one recording head formed in one are sufficient.

[0031] In addition, this invention is effective when the thing of a serial type like an upper example also uses the recording head fixed to the main part of equipment, the recording head exchangeable chip type to which the electric connection with the main part of equipment and supply of the ink from the main part of equipment are attained by the main part of equipment being equipped, or the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one.

[0032] Moreover, it is a book as composition of the recording device of this invention to add the regurgitation recovery means of a recording head, preliminary auxiliary means, etc. If these are mentioned concretely, a preheating means to heat using the capping means, the cleaning means, the pressurization or the suction means, the electric thermal-conversion object, the heating elements different from this, or such combination over a recording head, and a reserve regurgitation means to perform the regurgitation different from record can be mentioned.

[0033] moreover, two or more ink which differs in an others and record color or concentration although only one piece was prepared also about the kind or the number of a recording head carried, for example corresponding to monochromatic ink -- corresponding -- two or more pieces -- more than -- it may be prepared That is, although not only the recording mode of only mainstream colors, such as black, but a recording head may be constituted in one as a recording mode of a recording device or the paddle gap by two or more combination is sufficient, for example, this invention is very effective also in equipment equipped with at least one of each of the full color recording mode by the double color color of a different color, or color mixture.

[0034] Furthermore, in addition, in this invention example explained above, although ink is explained as a liquid It is ink solidified less than [a room temperature or it], and what is softened or liquefied at a room temperature may be used. Or by the ink-jet method, since what carries out a temperature control is common as a temperature control is performed for ink itself within the limits of 30 degrees C or more 70 degrees C or less and it is in the stable regurgitation range about the viscosity of ink, ink may use what makes the shape of liquid at the time of use record signal grant. In addition, in order to prevent the temperature up by heat energy positively because you make it use it as energy of the change of state from a solid state to the liquid state of ink, or in order to prevent evaporation of ink, you may use the ink which solidifies in the state of neglect and is liquefied by heating. Anyway, ink liquefies by grant according to the record signal of heat energy, and this invention can be applied when using the ink of the property liquefied for the first time by grant of heat energy, such as that by which liquefied ink is breathed out, and a thing which it already begins to solidify when reaching a record medium. The ink in such a case is good for a porosity sheet crevice or a breakthrough which is indicated by JP,54-56847,A or JP,60-71260,A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the state where it was held as a solid. In this invention, the most effective thing performs the film-boiling method mentioned above to each ink mentioned above.

[0035] Furthermore, in addition, as a gestalt of this invention ink-jet recording device, although used as the picture outgoing end end of information management systems, such as a computer, you may take the gestalt of the reproducing unit combined with others, the reader, etc., and the facsimile apparatus which has a transceiver function further.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the typical front view of the ink-jet recording device concerning this invention.

[Drawing 2] It is the typical cross section showing the 1st example of the ink-jet recording device concerning this invention.

[Drawing 3] It is the typical perspective diagram of the platen of an ink-jet recording device and slot which were shown in drawing 1 .

[Drawing 4] It is the typical cross section showing the modification of the example shown in drawing 2 .

[Drawing 5] It is the typical cross section showing the 2nd example of the ink-jet recording device concerning this invention.

[Drawing 6] It is the typical perspective diagram showing other modifications of the ink-jet recording device concerning this invention.

[Drawing 7] It is the typical side elevation showing the conventional ink-jet recording device.

[Drawing 8] It is the typical side elevation showing other examples of the conventional ink-jet recording device.

[Description of Notations]

- 1 Carriage
- 2 Rail
- 3 Paper Presser-Foot Board
- 4 Recording Paper
- 5 Ejection Roller
- 6 Platen
- 7 Blade
- 8 Capping -- Member
- 9 Spur
- 10 Ink Tube
- 11 Flexible Circuit Board
- 12 Slot
- 13 Recording Head
- 14 Absorber
- 15 Handle

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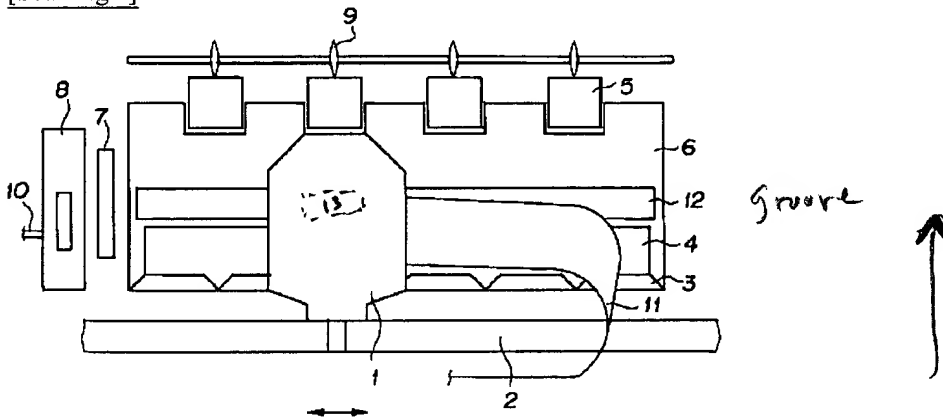
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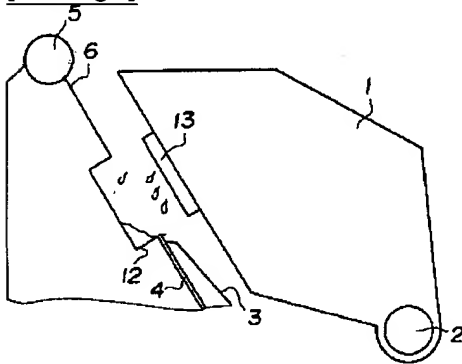
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DRAWINGS

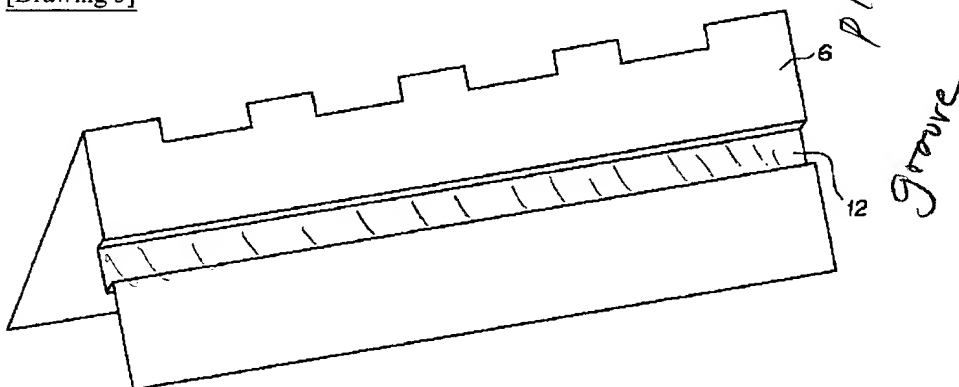
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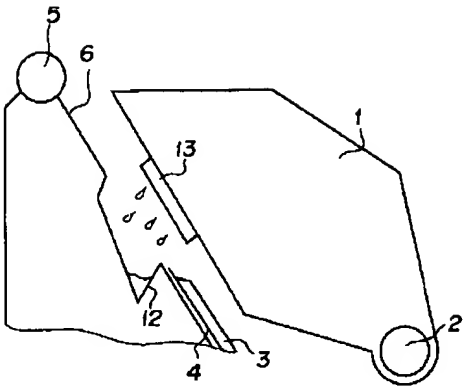
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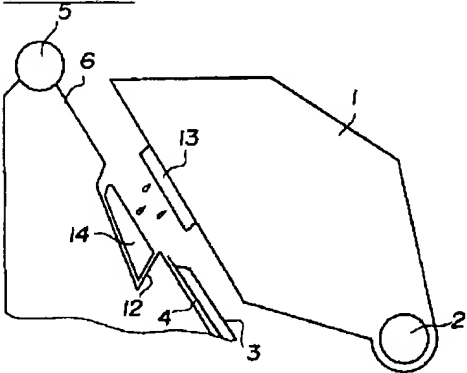
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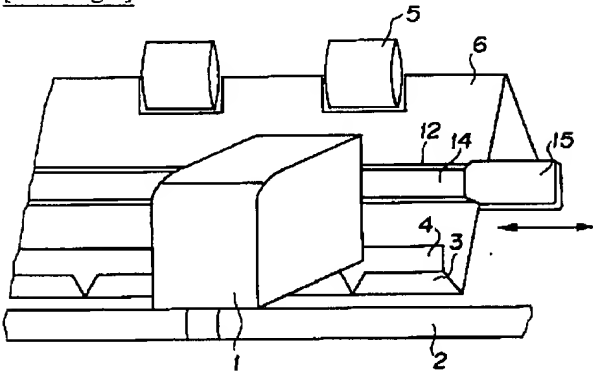
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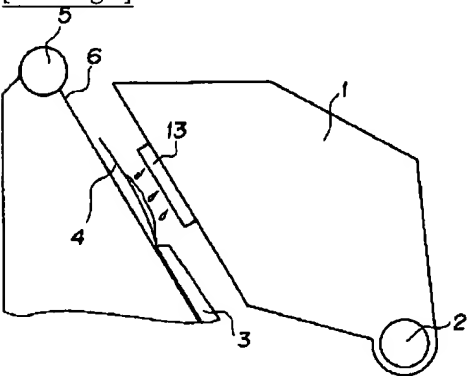
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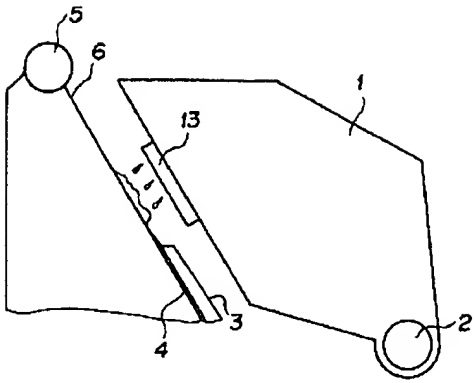
[Drawing 6]



[Drawing 7]



[Drawing 8]



[Translation done.]